The Emperor Has No Blanket!

Commentary to Bruineberg, Dolega, Dewhurst, and Baltieri (2021). *The Emperor's New Markov Blanket. Behavioral and Brain Sciences.*

Vicente Raja^{1*}, Edward Baggs^{2,3}, Anthony Chemero^{4,5}, and Michael L. Anderson^{1,6,7}

1Rotman Institute of Philosophy, Western University (Canada)

2Department of Language and Communication, University of Southern Denmark (Denmark)

3Danish Institute for Advanced Study, University of Southern Denmark (Denmark)

4Department of Philosophy, University of Cincinnati (USA)

5Department of Psychology, University of Cincinnati (USA)

6Brain and Mind Institute, Western University (Canada)

7Department of Philosophy, Western University (Canada)

*Corresponding Author: vgalian@uwo.ca; <http://www.emrglab.org>

Abstract

While we applaud Bruineberg et al.'s analysis of the differences between Markov blankets and Friston blankets, we think it is not carried out to its ultimate consequences. There are reasons to think that, once Friston blankets are accepted as a theoretical construct, they do not do the work proponents of FEP attribute to them. The emperor is indeed naked.

The title of the target article gestures towards H. C. Andersen's *The Emperor's New Clothes* short story. The core of the story is a child saying what all the neighbors already knew but were afraid to say: that the emperor had no clothes! After this suggestive title, we expected a paper that not only would analyze the differences between Markov and Friston blankets but that, following the child's lead, would tell us whether the theoretical construct of "Friston blankets" is doing the job many FEP proponents attribute to it. Namely, it would tell us whether Friston blankets are indeed a principled way to find the ontological boundaries between biological/cognitive systems and environments.

Against our expectations, the target article concludes in an ecumenical way taking Markov and Friston blankets as two different constructs for two different projects. In the case of Friston blankets the project is an ontological one that is focused on finding boundaries in a principled way—e.g., organismal boundaries in the case of the cell

membrane or cognitive boundaries in the case of sensory receptors and motor effectors. We think, however, this ecumenical solution is supported neither by the arguments in the target article nor in the current literature on FEP. Indeed, all things considered, a more radical consequence is preferable: Friston blankets do not provide a principled way to find ontological boundaries between biological/cognitive systems and their environments.

The reasons to endorse such a radical consequence are both technical and theoretical. Technically speaking, recent work has consistently shown problems with both the formalism of Friston blankets (Biehl et al., 2021) and its scope (Aguilera et al., 2021). We think these problems are substantive and point to a mismatch between the promises of FEP as a framework and its theoretical and mathematical development to date. The typical response to these technical problems is that the FEP formalism is a work in progress, so these

problems will eventually be solved. This is perfectly fine, but a work in progress is not sufficient to support the grandiose claims FEP proponents make about its current relevance for theoretical biology, cognitive science, or even physics (e.g., Friston, 2019; see also the Introduction of the target article). However interesting and important these technical issues are, we think the problems with Friston blankets go beyond them. Even granting that the formalism is right and fairly complete, Friston blankets do not do the principled, ontological work they are claimed to do. We discussed this in depth in Raja et al. (2021). One of our arguments parallels the target article's argument of ambiguous boundaries exemplified by various Friston blanket models of the knee-jerk reflex, so we will not repeat it here.

Another argument has to do with the fact that the states of the system partitioned by Friston blankets must be decided before finding the blanket. Consider an organism which, moving around in its environment, encounters a gap between obstacles. The organism must know whether the gap is big enough to fit its body through. In this situation, the environmental states might be of at least two kinds: (i) the position of each of the obstacles or (ii) the relative position of the obstacles (i.e., the gap). Depending on describing this environment in terms of (i) or (ii), the internal states of the organism will be inferring relationships from non-relative states or detecting relative states, respectively. Friston blankets do not help with this decision. A different set of resources to decide ontological questions such as *what* environmental states are and *how* these states relate to the internal ones is needed. These resources are the ones making the ontological heavy-lifting, so the principled nature of the Friston blankets seems to be challenged. More generally, this argument relates to the inability of Friston blankets to deal with relational properties. This is a big problem for FEP's ambition to provide a theory of cognition because relational properties are ubiquitous within organism-environment systems. For instance, if affordances are organism-environment

relationships, they seem to cut across any partition of the systemic states with Friston blankets.

A further issue, pointed out by Di Paolo et al. (2021) and Raja et al. (2021), is that Friston blankets are unable to account for autopoietic self-organization. The paradigmatic example of autopoietic self-organization is the cell. The membrane of a cell is the *product* of the internal mechanisms of the cell itself. FEP proponents have suggested that the cell membrane can be understood as a Friston blanket. However, while Friston blankets are used to model the input-output relations of the cell through its membrane boundary, they say nothing about how the blanket itself comes to existence as the product of cellular activities. This is what autopoietic self-organization seeks to explain but within the Friston blanket framework it is merely presupposed. Additionally, in the case of cognitive systems, Friston blankets always appear in the context of inferential frameworks (therefore active inference), and inferential frameworks have their own issues (see Raja, 2020) that are neither dependent on nor solved by the use of Friston blankets.

In summary, Friston blankets need many other assumptions, and these other assumptions are the ones doing the ontological work (e.g., deciding what the states are, what the system does, how the system self-organizes, and so on). Friston blankets cannot be the arbiters of ontological debates. They might be just tools for modeling a previously decided ontology, but that claim requires further work that is not found in the FEP literature so far. In this context, we are in general agreement with the target article that Friston blankets are not just Markov blankets. However, we think the authors do not fully embrace the consequences of their own conceptual move. Friston blankets are not good resources for finding ontological boundaries. Maybe it is more sensible to follow William James in understanding the boundary-line of the mental—and, we add, of life—as something paradigmatically vague and, therefore, to be more pluralistic in our attempts to model it.

Conflict of Interest Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this commentary.

Funding Statement

This research was supported in part by a Canada Research Chairs Program award to MA, grant number SSHRC 950-231929. AC was supported by the Charles Phelps Taft Research Center at University of Cincinnati (USA).

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